

present between the first and second workpieces, wherein the plastic deformation occurs before or in a welding zone; and

guiding the squeeze roller along the edge in a manner such that the plastic deformation produced is substantially dependent on the force acting on the squeeze roller and is substantially independent of the line of the joint.

41. (New) The method of claim 40, further comprising the steps of:

sensing the width of the gap adjacent the squeeze roller with a gap sensing device; and
controlling the amount of force applied to the squeeze roller as a function of the gap adjacent the squeeze roller, thereby controlling the gap between the sheet metal workpieces.

42. (New) The method of claim 40, further the step of:

determining the position of the gap after deformation using a gap position sensor; and
guiding a welding machine operably connected to the gap position sensor, wherein the welding machine guide is guided relative to the gap using input from the gap position sensor.

REMARKS

2. Claims 11, 23-28 and 30-33 are rejected under 35 U.S.C. §103(a) as being unpatentable over Kitahama in view of Bischofberger. Specifically, the Examiner indicates that Kitahama discloses that that end portions are brought into contact with each other due to metal flow. The Examiner subsequently indicates that it would be obvious to one of skill in the art to use blocks for clamping as taught by Bischofer in the Kitahama system. Applicant respectfully disagrees with the Examiner's characterization of the references and the rejection based thereon.

Kitahama discloses a "Method of Continuously Hot-Rolling Sheet Bars" that includes the provision of pressing rolls 5 for "for at least the two widthwise directional ends, or corners of each successive rear end portion of the cut leading sheet bar 1 and the front end portion of trailing sheet bar 2." (col. 3, lines 18-22) The sheet bars 1 and 2 are initially abutted against one another. The thickness reduction applied to the end portions brings those end

portions into contact with one another, but purposefully results in the formation of a gap ("g") between the two sheet bars 1 and 2.

Applicant respectfully submits that there are several significant differences between Kitahama and the apparatus of claim 11. First, Kitahama discloses a method for hot-rolling sheet bars. Claims 11, 23-28 and 30-33, on the other hand, recite an apparatus for handling a pair of sheet metal workpieces to be welded. Hence, the joining process is fundamentally different. Second, the first and second workpiece holders of claims 11, 23-28 and 30-33 are positioned so that an edge of one of the pair of sheet metal workpieces is in contact with, or separated a gap from, an edge of the other sheetmetal workpieces, and the wherein force selectively applied to the squeeze roller will cause plastic deformation of one of the pair of sheet metal workpieces and thereby cause the deformed sheet metal workpiece to extend into the gap. Kitahama, in contrast, teaches that sheet bars 1 and 2 abut one another until thickness reduction is applied to the edge portions at which point the workpieces separate from another; i.e., the exact opposite from the functionally described elements of the claimed apparatus. Finally, Kitahama actually teaches away from the apparatus of claims 11, 23-28 and 30-33 by indicating that abutting sheet bars that did not have thickness reduction at the ends were not adequately joined by hot rolling (col.7, lines 49-58).

The Examiner indicates that Bischofberger provides that clamping and holding elements of claims 11, 23-28 and 30-33. Applicant respectfully submits that the teachings of Bischofberger do not supply the deficiencies of Kitahama necessary to support the rejection.

In addition, applicant respectfully submits there is no suggestion or motivation to combine the teachings of Bischofberger and Kitahama. As indicated above, the joining processes of Kitahama (i.e., hot-rolling) are fundamentally different from those used in Bischofberger (i.e., welding). The above-identified section of Kitahama (col.7, lines 49-58), wherein Kitahama teaches away from plastically deforming a workpiece to fill any gap between adjacent workpieces, illustrates the differences and the lack of motivation to combine the processes. For at least the reasons provided above, applicant respectfully requests the Examiner allow claims 11, 23-28 and 30-33.

Regarding claim 24, applicant respectfully submits that Bischofberger does not disclose a workpiece brake "disposed at an acute angle relative to the contacted sheet metal

workpiece". As stated in the present application, the claimed orientation of the workpiece brake is advantageous because it provides desirable access to the joint zone for auxiliary devices; e.g., sensors, etc. Accordingly, applicant respectfully submits that claim 23 is not obvious in view of the cited references, and therefore requests claim 24 be allowed.

Regarding claims 25 and 31, applicant respectfully submits that neither reference discloses a gap sensing device for sensing the width of the gap adjacent a squeeze roller, or a controller for controlling the amount of force applied to the squeeze roller as a function of the gap adjacent the squeeze roller, to thereby control the gap between the sheetmetal workpieces, as is claimed in claims 25 and 31. Accordingly, applicant respectfully submits that claims 25 and 31 are not obvious in view of the cited references, and therefore requests claims 25 and 31 be allowed.

Regarding claims 26 and 32, applicant respectfully submits that neither reference discloses a gap position sensor for determining the position of the gap after deformation, and a welding machine guide operably connected to the gap position sensor, wherein the welding machine guide guides the welding machine relative to the gap using input from the gap position sensor, as is claimed in claims 26 and 32. Accordingly, applicant respectfully submits that claims 26 and 32 are not obvious in view of the cited references, and therefore requests claims 26 and 32 be allowed.

3. Claims 12-22, 29, 34, and 35 are objected to as being dependent on a rejected base claim, but will be allowed if rewritten in independent form where appropriate. Applicant thanks the Examiner for the provisional allowance of claims 12-22, 29, 34, and 35. Applicant has amended claims 12, 29, and 24 into independent form, including the limitations of any intervening claims. Accordingly, applicant respectfully requests claims 12-22, 29, 34, and 35 be passed onto allowance.

Applicant includes new claims 36-42 to claim subject matter disclosed in the

application as filed, but not claimed. In the event a fee in excess of the amount already provided is due, please charge our Deposit Order Account No. 13-0235.

Respectfully submitted,
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APPENDIX OF AMENDED TITLE AND CLAIMSIn the Title:

The Title has been amended as follows:

-- APPARATUS AND METHOD FOR HANDLING SHEETMETAL
WORKPIECES TO BE WELDED --

In the Claims:

11. (First Amendment) An apparatus for handling a pair of sheet metal workpieces to be welded, comprising:

a first workpiece holder;

a second workpiece holder;

wherein the first and second workpiece holders are positioned so that an edge of one of the pair of sheet metal workpieces is in contact with, or separated by a gap from, an edge of the other sheetmetal workpieces;

a backing element disposed on a first side of the sheet metal workpieces; and

a squeeze roller, disposed on a second side of the sheetmetal workpieces opposite the first side and substantially aligned with the backing element, wherein the squeeze roller is formed as a body symmetrical in rotation, and wherein force selectively applied to the squeeze roller will cause plastic deformation of one of the pair of sheet metal workpieces and thereby cause the deformed sheet metal workpiece to extend into the gap.

12. (First Amendment) [The apparatus of claim 11, wherein the squeeze roller is spherically shaped] An apparatus for handling a pair of sheet metal workpieces to be welded, comprising:

a first workpiece holder;

a second workpiece holder;

wherein the first and second workpiece holders are positioned so that an edge of one of the pair of sheet metal workpieces is in contact with, or separated a gap from, an edge of the other sheetmetal workpieces;

a backing element disposed on a first side of the sheet metal workpieces; and

a spherically shaped squeeze roller, disposed on a second side of the sheetmetal workpieces opposite the first side and substantially aligned with the backing element;
wherein force selectively applied to the squeeze roller will cause plastic deformation of one of the pair of sheet metal workpieces and thereby cause the deformed sheet metal workpiece to extend into the gap.

27. (First Amendment) An apparatus for handling a pair of sheet metal workpieces to be welded, comprising:

- a first workpiece holder;
- a second workpiece holder;

wherein the first and second workpiece holders are positioned so that an edge of one of the pair of sheet metal workpieces is in contact with, or separated by a gap from, an edge of the other sheetmetal workpieces; and

means for plastically deforming one of the sheet metal workpieces, wherein said means for plastically deforming one of the sheetmetal workpieces can be selectively applied to cause that sheet metal workpiece to extend into the gap.

29. (First Amendment) [The apparatus of claim 28,] An apparatus for handling a pair of sheet metal workpieces to be welded, comprising:

- a first workpiece holder;
- a second workpiece holder;

wherein the first and second workpiece holders are positioned so that an edge of one of the pair of sheet metal workpieces is in contact with, or separated a gap from, an edge of the other sheetmetal workpieces; and

means for plastically deforming one of the sheet metal workpieces, wherein the means can be selectively applied to cause that sheet metal workpiece to extend into the gap, and wherein the means includes a backing element disposed on a first side of the sheet metal workpieces, and a spherically shaped squeeze roller that is mounted on a support to permit rotation in any direction and disposed on a second side of the sheetmetal workpieces opposite the first side and substantially aligned with the backing element, wherein force selectively

applied to the squeeze roller will cause plastic deformation of one of the pair of sheet metal workpieces and thereby cause the deformed sheet metal workpiece to extend into the gap [wherein the squeeze roller is spherically shaped and is mounted on a support to permit rotation in any direction].

33. (First Amendment) An apparatus for handling a pair of sheet metal workpieces to be welded, comprising:

a first workpiece holder;

a second workpiece holder;

wherein the first and second workpiece holders are positioned so that an edge of one of the pair of sheet metal workpieces is in contact with, or separated by a gap from, an edge of the other sheetmetal workpieces;

a pair of backing elements disposed on a first side of the sheet metal workpieces; and

a pair of squeeze rollers, disposed on a second side of the sheetmetal workpieces opposite the first side and substantially aligned with the backing elements, wherein the squeeze rollers are formed as a body symmetrical in rotation, and wherein force selectively applied to the squeeze rollers will cause plastic deformation in the pair of sheet metal workpieces and thereby cause the sheet metal workpieces to extend into the gap.

34. (First Amendment) [The apparatus of claim 33,] An apparatus for handling a pair of sheet metal workpieces to be welded, comprising:

a first workpiece holder;

a second workpiece holder;

wherein the first and second workpiece holders are positioned so that an edge of one of the pair of sheet metal workpieces is in contact with, or separated a gap from, an edge of the other sheetmetal workpieces;

a pair of backing elements disposed on a first side of the sheet metal workpieces; and
a pair of squeeze rollers, disposed on a second side of the sheetmetal workpieces opposite the first side and substantially aligned with the backing elements, wherein the squeeze rollers are spherically shaped, and wherein force selectively applied to the squeeze rollers will cause

plastic deformation in the pair of sheet metal workpieces and thereby cause the sheet metal workpieces to extend into the gap [wherein the squeeze rollers are spherically shaped].